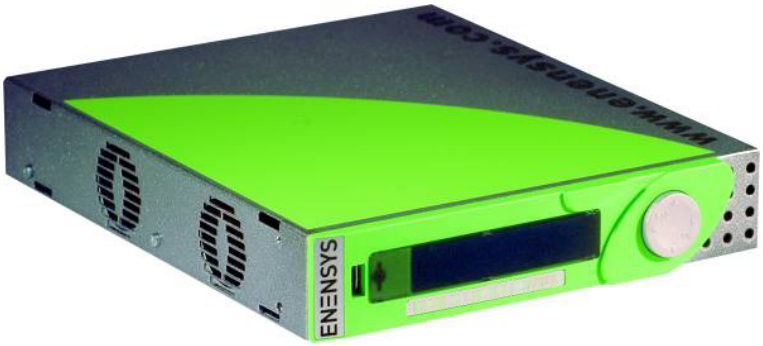
CastXplorer-C

Digital Cable RF Network Probe

User Manual



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Contents

1 Introduction **3**
- 1.1 Product overview . . . 3
- 1.2 Typical Applications . . . 3
- 1.3 Related documents . . . 4

2 Features **4**
- 2.1 Monitoring . . . 4
- 2.2 Mirrored Outputs . . . 5
- 2.3 SNMP Core . . . 5
- 2.4 Requirements . . . 6

3 Walk Around **7**
- 3.1 Front Panel . . . 7
  - 3.1.1 Navigation . . . 8
  - 3.1.2 Key settings . . . 8
  - 3.1.3 Available information . . . 9
- 3.2 Back Panel . . . 9
- 3.3 Graphical User Interface . . . 10
  - 3.3.1 Menu . . . 10
  - 3.3.2 Operation . . . 10
  - 3.3.3 Status . . . 11
- 3.4 Main panels . . . 12

4 Quick Start **12**

5 Managing channels **14**
- 5.1 Managing the channel list . . . 14
  - 5.1.1 Adding a channel . . . 14
  - 5.1.2 Removing a channel . . . 15
  - 5.1.3 Managing channels through SNMP . . . 15
- 5.2 Selecting channels to monitor . . . 15
  - 5.2.1 Adding a channel to the monitoring list . . . 16
  - 5.2.2 Removing a channel from the monitoring list . . . 16
  - 5.2.3 Ordering channels in the monitoring list . . . 17
  - 5.2.4 Managing monitored channels through SNMP . . . 17

6 Monitoring QoS in real-time **17**
6.1 Real-time monitoring . . . 17
6.1.1 Real-time bit rates . . . 18
6.1.2 Real-time RF parameters . . . 18
6.1.3 Real-time statistics summary . . . 19
6.2 Alarms status and counters . . . 20
6.3 Raising alarms to log messages . . . 20

7 Managing statistics files **21**
7.1 Selecting parameters . . . 21
7.2 Creating statistics files . . . 22
7.3 Retrieving statistics files . . . 22
7.3.1 Retrieving statistics files through FTP . . . 23
7.3.2 Retrieving statistics files through the Web GUI . . . 23
7.4 Managing statistics files through SNMP . . . 24
7.5 Statistics files format . . . 24
7.5.1 CSV file format . . . 24
7.5.2 XML file format . . . 25

8 Setting custom alarm thresholds **26**
8.1 What is an alarm? . . . 26
8.2 Setting thresholds . . . 27
8.3 Setting thresholds through SNMP . . . 28

9 Using CastXplorer-C through SNMP **29**
9.1 Overview . . . 29
9.2 Overall MIB data structure . . . 29
9.2.1 MIB tree for all ENENSYS devices . . . 30
9.3 SNMP ports . . . 31
9.4 Connecting CastXplorer-C to a NMS . . . 31
9.5 Receiving traps from CastXplorer-C . . . 32
9.5.1 Setting thresholds . . . 32
9.5.2 Enabling traps . . . 34
9.5.3 Example of trap received . . . 34
9.6 Integrating ENENSYS-ENTERPRISE-MIB.mib file . . . 36
9.7 Integrating ENENSYS-MONITOR-MIB.mib file . . . 37

10 Upgrading CastXplorer-C **39**
10.1 Getting information on current release . . . 39
10.2 Installing an upgrade firmware . . . 39

11 Getting general information about the probe **40**

12 Identifying the CastXplorer-C controlled **40**

13 Using the dry relay out interface **40**

14 Definitions of parameters monitored **41**
14.1 RF and transmission parameters 41
14.2 ETR290 parameters 42

15 Regulatory and Statutory Notices **45**
15.1 EMC and safety declaration 45
15.2 Environmental specifications 45

16 Technical Data **46**
16.1 Interfaces Specifications 46
16.1.1 RF Interfaces 46
16.1.2 ASI Interfaces 46
16.1.3 Ethernet Interface 46
16.1.4 Fault Relay Alarm 47

17 Frequently Asked Questions **48**
17.1 What is the IP address of the CastXplorer-C? 48
17.2 My monitoring panel looks frozen 48

18 Troubleshooting **48**
18.1 Web server is not responding 48
18.2 Web interface shows wrong information 48

19 Equipment return for repair **49**

20 Upgrades and Privileged Area **49**

21 Contact Information **50**

1 Introduction

1.1 Product overview

ENENSYS CastXplorer-C is a standalone network probe used to receive RF Digital Cable streams and record statistics logs of all key measurements. It can be placed very close to the end-user in order to achieve a complete real-time diagnosis system.

The CastXplorer-C is a compact Network Probe designed to combine continuous monitoring of both critical RF and MPEG2-TS parameters to provide Cable carriers with a constant view of their network health and status with excellent cost-efficiency.

CastXplorer-C is a Digital Cable standalone analyzer used for continuous monitoring and health diagnosis of Cable networks. The probe is capable of continuously logging all statistics values and sending SNMP traps if parameters values get out of the defined range. This allows long-term performance monitoring of the network combined with real-time reception of key alarms, thus achieving the optimal trade-off between alarm severity and alarm management time.

Combined with a Network Monitoring System, CastXplorer-C turns into a powerful network diagnosis tool allowing cable carriers to highlight global trends and to anticipate potential failures. For maximum cost-efficiency, CastXplorer-C is capable of monitoring multiple channels on a round-robin basis. One single CastXplorer-C can be installed at a specific location to monitor the complete set of multiplexes operated.

1.2 Typical Applications

CastXplorer-C has been specially designed for helping Cable Carriers and Cable MSOs to achieve accurate QoS monitoring on their networks.

CastXplorer-C is especially fit for real-time monitoring of the quality delivered on the last mile as well as for long-term performance management.

1.3 Related documents

[1]	**ITU-T J83**	"ITU-T Recommendation J.83(4/97), "Digital multi-programme systems for television sound and data services for cable distribution."
[2]	**EN 300 429**	"Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems." (DVB-C)
[3]	**ETSI TR 101 290**	"Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems"
[4]	**EN 300 468**	"Digital Video Broadcasting (DVB); Specifications for Service Information (SI) in DVB systems."
[5]	**TR 101 891**	"Digital Video Broadcasting (DVB); Professional Interfaces: Guidelines for the implementation and usage of the DVB Asynchronous Serial Interface (ASI)"

2 Features

2.1 Monitoring

CastXplorer-C is intended to continuously monitor all the channels listed for management. It is capable of listing up to 255 channels.

Then CastXplorer-C is capable of monitoring a single channel continuously or multiple channels one after the other. In that case, a monitoring periodicity must be defined to specify how long each channel will be monitored. The monitoring periodicity is common to all channels.

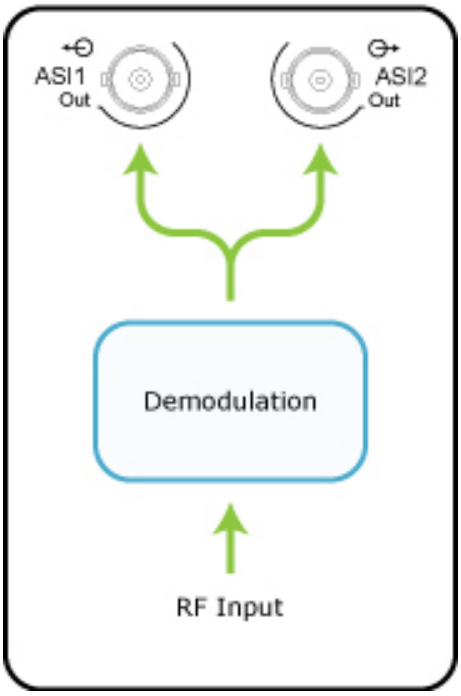
Also, CastXplorer-C is capable of simultaneously achieving two types of monitoring:

- Real-time monitoring: For improved reactivity on the network: CastXplorer-C features a Monitoring panel on the Web-based GUI and can send SNMP traps or dry relay signals.
- Statistical monitoring: For long-time performance management: CastXplorer-C records values of all parameters at a specified sampling periodicity, thus allowing the identification of potential future failures.

2.2 Mirrored Outputs

The signal received on the RF input is demodulated, and the same baseband signal is sent to both ASI output ports.

These outputs can be used for further monitoring, stream recording or sent back in real-time to another equipment.

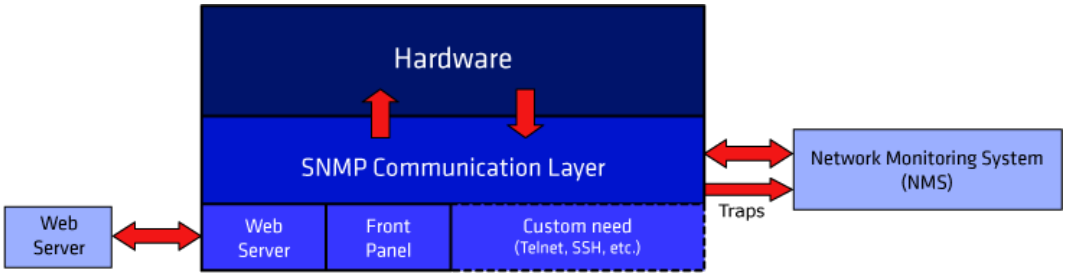


2.3 SNMP Core

SNMP is the core communication layer used in CastXplorer-C. CastXplorer-C devices fully comply with the SNMP v2 protocol.

Any command that can be issued through the Web GUI or the front panel can also be done through SNMP requests.

This architecture ensures that CastXplorer-C can be fully controlled with SNMP and easily integrated with any existing NMS.



2.4 Requirements

CastXplorer-C network probes embed a Web server that provides a friendly and easy to use graphical user interface. This interface is Flash-based, therefore a PC (or Mac) with Adobe Flash Player installed is required. Adobe Flash Player can be downloaded at the following address:

http://www.adobe.com/products/flashplayer

Note: Web browsers tend to use as much memory as they can. It is thus recommended to close the Web browsers windows when they are not needed.

As the Web-based interface offers a rich user experience, a computer with 512 MB RAM and at least PIV is required. The screen resolution should be set to at least 1280x1024 pixels.

CastXplorer-C network probes are fully compliant with the SNMP[1] v2 protocol: They can be completely configured and operated through standard SNMP requests (Gets, Sets and Traps). MIB[2] files are available on request and can be used to monitor or configure CastXplorer-C devices through NMS[3].

[1] Simple Network Management Protocol
[2] Management Information Base
[3] Network Management Systems

3 Walk Around

3.1 Front Panel

CastXplorer-C devices offer an intuitive front panel that displays current settings and allows key settings such as network configuration.

A green led is visible when the CastXplorer-C is locked to a Digital Cable frequency and operates properly.

The led turns red or orange to inform you of a problem occurring on the CastXplorer-C or on the network monitored:

- LED turns orange if at least one alarm with "Warning" level has raised.
- LED turns red if at least one alarm with "Critical" level has raised.

When the front panel button is not used for 30 seconds, it turns to standby mode.

The front panel can be used to:

- Monitor internal temperature (Status > Temperature)
- Configure or check the Ethernet interface (Network > Control Interface)
- Configure or check date and time information (Network > Date & Time)
  - Enable or disable NTP Server (NTP Server's IP address must be configured through GUI)
  - Set or check current date (format is YYYY-MM-DD)
  - Set or check current time (format is HH-MM-SS)
- Configure or check NMS server address and community (Network > NMS)
- Get information about the CastXplorer-C's serial number and firmware version (About)

Note: The USB port on the front panel is only used for ENENSYS internal maintenance purposes. Do not try to use it to communicate with the CastXplorer-C.

3.1.1 Navigation

It is possible to navigate into the CastXplorer-C's menus by using the button on the right.

- Press 'UP' or 'DOWN' to go to the previous/next item,
- Press 'RIGHT' to validate (go inside menu)
- Press 'LEFT' to cancel (go up one level)

3.1.2 Key settings

It is possible to change the key settings by using the front panel and the button. It can be very useful when one does not have access to the web user interface and wants, for instance, to change the network settings.

As an example, here is the step by step procedure to change the IP address for the "Control Eth." interface:

1. Press 'DOWN' until the arrow (left side) is displayed next to 'Network'
2. Press 'RIGHT' to go inside the 'Network' menu
3. Press 'RIGHT' to go inside the 'Control' menu
4. Press 'RIGHT' to go inside the 'CTRL IP Address' menu The LCD now displays the current IP address. Press 'RIGHT' to switch to edit mode. The IP address digit which is blinking is the one that is being modified.
5. Press 'UP' or 'DOWN' to change the digit's value
6. Press 'LEFT' or 'RIGHT' to move to the previous/next digit
7. Once the IP address is correct, press 'RIGHT' until the end of the line is reached to validate the new IP address.
8. If you made a mistake and want to cancel the changes, press 'LEFT' until the start of the line is reached.

3.1.3 Available information

The following information is available from the front panel LCD:

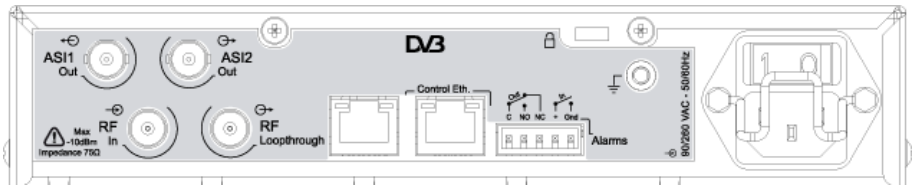
- Status: Monitor internal temperature
- Network > Control Interface: Settings for the control Ethernet interface: IP address, subnet mask and gateway can be displayed/modified
- Network > Date and Time: NTP server, date and time information
- network > NMS: NMS information (trap receiver and community)
- About: Serial number and firmware version

3.2 Back Panel

The back panel features all interfaces useful to connect the CastXplorer-C to the IP network for control, and to the Digital Cable signal for monitoring purposes. Demodulated signal can also be used for capture and advanced analysis.

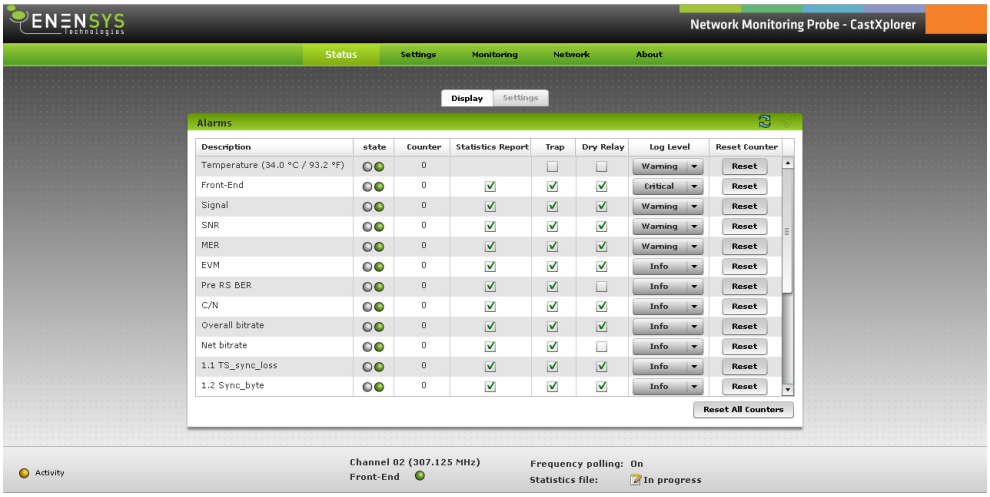
- 1x RF input (75ohm, F female)
- 1x RF passive loopthrough (75ohm, F female)
- 2x ASI mirrored outputs (75ohm, BNC female)
- 1x Ethernet control interface (RJ45)
- 1x Relay out interface (5-position MiniConnec, 3.81mm pitch)
- 1x power receptacle with On/Off switch (90-260VAC, 50/60Hz)

Note: CastXplorer-C also features one Kensington security slot to secure the probe to its location.



3.3 Graphical User Interface

This section describes the web interface that can be used to configure and monitor the CastXplorer-C.



The web interface contains 3 different parts:

- Menu (upper part)
- Operation (center part)
- Status (lower part)

3.3.1 Menu

The menu is used to select the panel that should be displayed in the operation part (center part).

3.3.2 Operation

The configuration and monitoring panel displays information depending on the selected item in the menu. It displays graphical components that are used to monitor or configure the CastXplorer-C.

3.3.3 Status

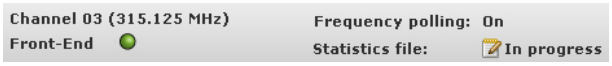
The status bar displays information that is always available to the user, whatever the component selected through the menu.

The component on the left hand side is the CastXplorer-C activity indicator.

Web application is sending a request to the embedded Web server and waiting for the Web server's response

LED switches to grey when a response has been received from the Web server and Web application has not sent a new request to the Web server.

Next to the activity component, information about the current processing is displayed:



- Channel currently monitored (name and frequency)
- Front-end status (Green = locked, Red = unlocked)
- Frequency polling status (On = multiple channel monitoring, Off = single channel monitoring)
- Statistics file status (In progress = Statistics file being written, Stopped = No statistics file creation requested)
- Switching frequency status (If multiple channel monitoring is enabled, a red progress bar will be displayed each time the front end locks to the next channel)

3.4 Main panels

The web interface can display 5 different panels:

- Status: Managing all alarms
- Settings: Managing channels, multiple channel monitoring and statistics files
- Monitoring: Monitoring all RF and MPEG2-TS parameters in real-time
- Network: Managing network interfacing
- About: Getting information about the device

4 Quick Start

For a direct connection between a PC and a CastXplorer-C, use an Ethernet cable (RJ45 plug) to connect CastXplorer-C's "Control Eth." port to the Ethernet port on your PC.

1. Plug the power cable shipped with the equipment into the power receptacle on the CastXplorer-C's back panel.
2. Connect the other end of the cable to mains power.
3. Connect a Digital Cable source signal to the RF input on the back panel using a 75 ohm impedance cable with F connectors.
4. Use the On/Off switch to power the CastXplorer-C.
5. After powering it on, allow a couple minutes for the CastXplorer-C to initialize and start.

As CastXplorer-C devices embed a web server, no software install is required apart from Adobe Flash player. The factory settings for the control interface are:

IP "Control Eth." interface 192.168.120.100

In order to display the web-based graphical user interface, open a Web browser (Internet Explorer and Mozilla/Firefox are recommended) using the control interface address:

http://192.168.120.100

The Web browser shall load the Flash based application that monitors and configures the CastXplorer-C.

5 Managing channels

5.1 Managing the channel list

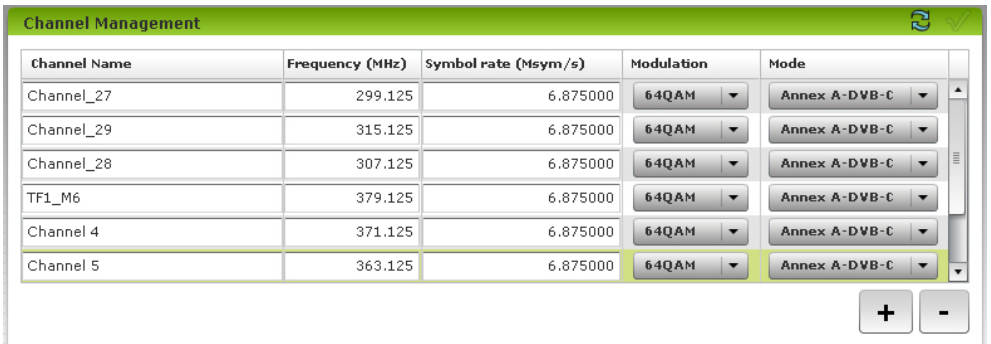
CastXplorer-C enables you to manage up to 255 channels. Each channel is defined by a "Channel name", a "Frequency", a "Symbol rate", a "Modulation" and a "Mode".

5.1.1 Adding a channel

To add a channel to the Channel list, go to the "Settings" tab. In the "Channel management" box, click the + button. A new line appears in the list allowing you to set your own parameters for the new channel.

1. Enter an appropriate "Channel name"
2. Enter the "Frequency" in MHz (from 50 to 900)
3. Specify the "Symbol rate" in Msym/s (from 0.87 to 7)
4. Specify the "Modulation" from 16QAM to 256QAM, or select "Auto" for automatic detection of the modulation used
5. Choose the "Mode" between "Annex A" (DVB-C, mostly used in Europe and Asia), "Annex B" (mostly used in North America) or "Annex C" (mostly used in Asia)
6. When all parameters have been properly set, validate all new settings by clicking the check sign button.

The new channel is added to the channel list in the "Channel management" box, but also into the "Tuner configuration" box.



5.1.2 Removing a channel

To remove a channel from the channel list, highlight the channel (by clicking on the line). Then click the − button. The channel is removed from the list. Validate all new settings by clicking the check sign button.

5.1.3 Managing channels through SNMP

Channel management is available through SNMP in the *ENENSYS-CASTXPLORER-MIB* file. Channel information is stored into a table that is available from the *testMonitoringLine* > *castXplorer* > *configuration* > *configChannel* > *profiles* node.

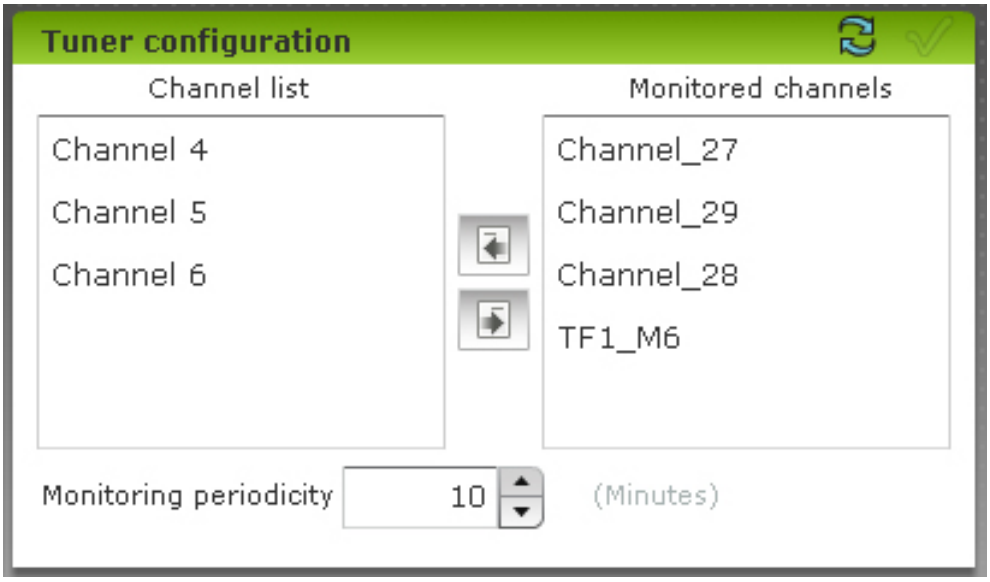
Please note that through SNMP, frequencies are expressed in Hz and symbol rates in sym/s.

5.2 Selecting channels to monitor

CastXplorer-C enables you to monitor multiple channels one after the other, on a round-robin basis. Each channel will be monitored for the duration specified. Each time the CastXplorer-C switches to the next frequency, the "Status bar" will show a red progress bar indicating that the RF front end is locking to the next frequency in the monitored channels list.

When channels have been defined in the "Channel management" box, they can be directly selected as channels to be monitored.

In the "Settings" tab, the "Tuner configuration" box presents two lists.



- "Channel list" on the left side displays all channels previously defined.
- "Monitored channels" on the right side displays all channels used for monitoring. All channels listed there will be monitored one after the other, from top to bottom. Each channel will be monitored for the duration defined in the "Monitoring periodicity" field (expressed in minutes).

5.2.1 Adding a channel to the monitoring list

To add a channel to the monitoring list:

1. Highlight the channel in the "Channel list".
2. Click the right arrow button (or drag and drop): Channel name displays in the "Monitored channels" list.
3. Validate all new settings by clicking the check sign button.

5.2.2 Removing a channel from the monitoring list

To remove a channel from the monitoring list:

1. Highlight the channel in the "Monitored channels" list.
2. Click the left arrow button (or drag-and-drop): Channel name displays in the "Channel list".
3. Validate all new settings by clicking the check sign button.

5.2.3 Ordering channels in the monitoring list

Each channel listed in the "Monitored channels" list in the "Tuner Configuration" box will be monitored in the order displayed from top to bottom, for the duration set in the "Monitoring periodicity" field. To change the order of a channel, simply drag and drop the channel to the appropriate position. Then, validate all new settings by clicking the check sign button.

5.2.4 Managing monitored channels through SNMP

Channel monitoring management is available through SNMP in the ENENSYS-CASTXPLORER-MIB file. Channel information is stored into a table that is available from the *testMonitoringLine* > *castXplorer* > *configuration* > *configChannel* > *profiles* node.

The "profilePollEnabled" OID is used to determine whether the channel should be monitored or not. When set to disabled (1), the channel will not be monitored. When set to enabled (2), the channel will be monitored.

For monitoring multiple channels on a round-robin basis, the *testMonitoringLine* > *castXplorer* > *configuration* > *configChannel* > *tuningMode* OID must be set to frequencyPolling (2). When this OID is set to standard (1), only one channel can be monitored.

The monitoring periodicity, which is common to all channels and specifies the time during which the CastXplorer-C will monitor each channel, is set through the *testMonitoringLine* > *castXplorer* > *configuration* > *configChannel* > *monitoringPeriodicity* OID.

Please note that through SNMP, re-ordering of channels is not available. Channels will always be monitored in the ascending order of the *profileIndex*.

6 Monitoring QoS in real-time

This section only provides information on getting QoS information in real-time from the Web interface. To get information on real-time SNMP traps, please refer to section 9.4, page 32.

The "Monitoring" tab displays real-time information on all parameters monitored on the current channel.

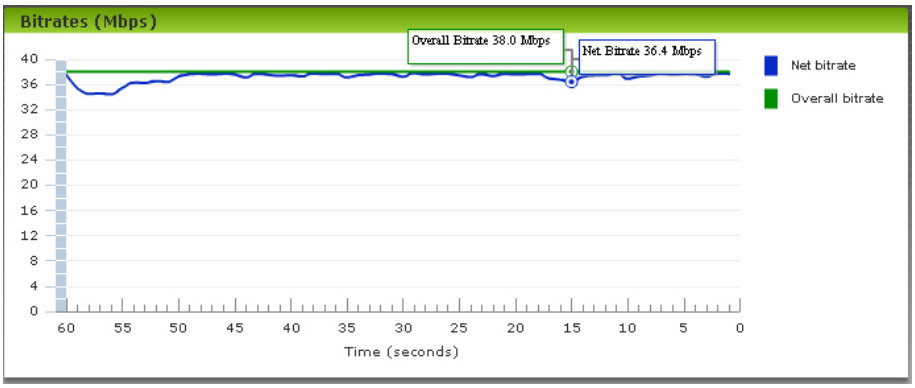
6.1 Real-time monitoring

The upper part of the "Monitoring" panel shows real-time graphs and gauges.

6.1.1 Real-time bit rates

The "Bit rates" box displays a real-time graph showing the evolution of bit rates over the last 60 seconds. Two bit rates are monitored (expressed in Mbps):

- Overall bit rate: Actual bit rate corresponding to the transmission channel
- Net bit rate: Useful bit rate (useful data only, no stuffing)

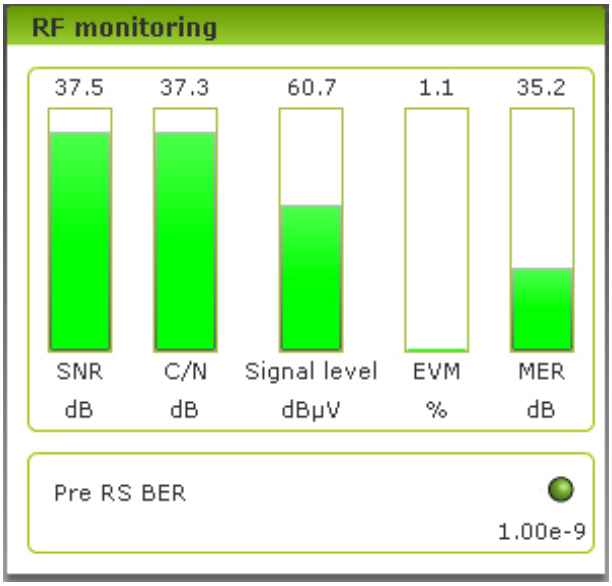


Pass the mouse over the graph to display the instant bit rate.

6.1.2 Real-time RF parameters

The "RF monitoring" box displays real-time values for all RF parameters monitored.

SNR, C/N, Signal Level, MER and EVM are displayed in the form of gauges. Pre-RS BER is displayed as a LED indicator.

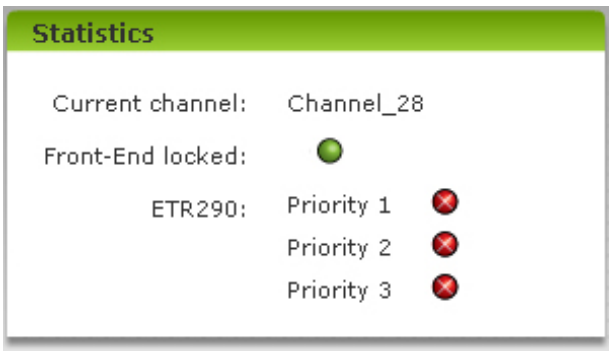


The gauge or LED indicator is displayed in green if the value is in the range of the thresholds defined in the "Status" > "Settings" panel. If the value is out of range, it is displayed in red.

6.1.3 Real-time statistics summary

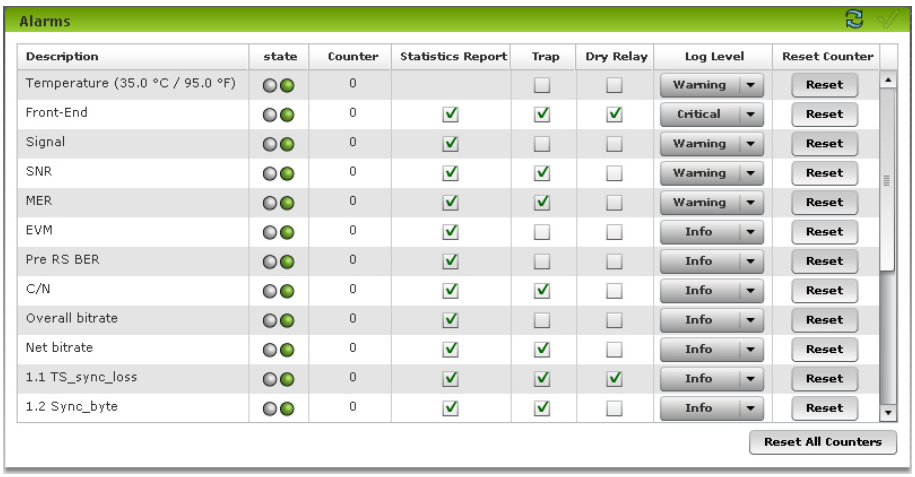
The "Statistics" box displays a real-time summary of RF front end status and ETR290 errors.

- RF front end: Channel currently monitored and lock status
- ETR290: For each priority, the LED indicator turns red if at least one error in the priority has been raised. Details on each error can be found in the "Status" panel.



6.2 Alarms status and counters

The "Status" > "Display" panel shows details on all alarms that were raised (based on defined thresholds).



The "State" column shows current state of alarms.

- Green LED: the value is within range
- Red LED: the value is out of range

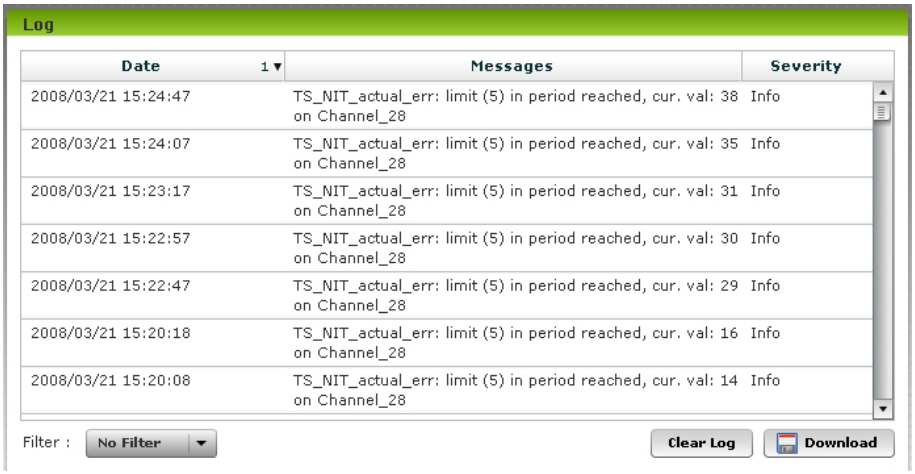
The "Counter" column shows the number of alarms raised on the parameter since the start of the monitoring on the current channel. Counter is incremented each time a parameter value goes out of range. These counters can each be reset by clicking the "Reset" button. All counters can be simultaneously reset by clicking the "Reset All Counters" button.

Important: All alarms counters (except temperature) are reset at the end of the monitoring periodicity, i.e. upon a frequency switch.

6.3 Raising alarms to log messages

Log messages are written to the "Log" box each time an alarm is raised. Raising an alarm is based on thresholds defined for each parameter in the "Status" > "Settings" panel.

The severity of each alarm (severity is then used for log message and SNMP trap) can be defined in the "Status" > "Display" panel. Three levels are available: Info, Warning and Critical.



The "Log" box displays up to 128 log messages. To clear all log messages, click the "Clear log" button. To save all log messages to a file, click the "Download" button, and specify location and file name.

It is also possible to filter the display of log messages based on the severity of the alarm. Choose minimum severity for which log messages should be displayed from the "Filter" drop-down list.

7 Managing statistics files

For long-term performance management, CastXplorer-C enables you to create statistics files. Statistics files are used to record RF and ETR290 parameter values at a regular periodicity, thus allowing you to view the evolution of the Quality of Service on multiple channels.

Statistics files are stored on the internal memory of the CastXplorer-C. Available storage space is 8MB.

If multiple channels are monitored (frequency polling enabled), a new statistics file will be created for each channel upon each monitoring periodicity. If one single channel is monitored, a new statistics file will be created upon each monitoring periodicity.

7.1 Selecting parameters

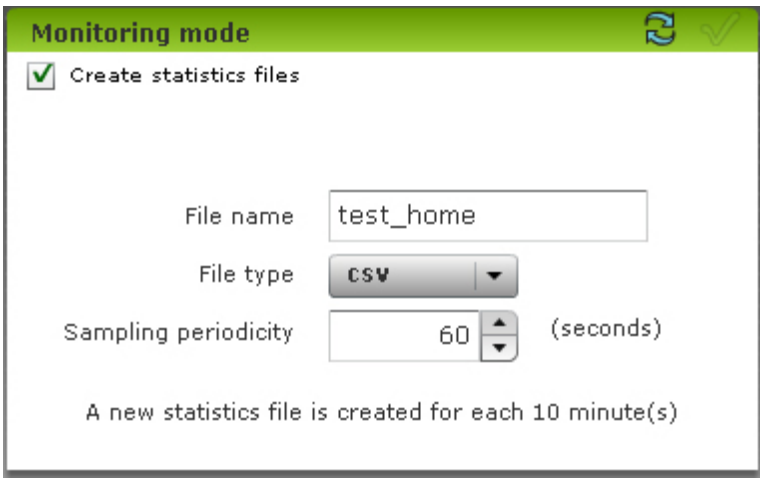
All parameters monitored can be written to the statistics files (default behaviour), but it is also possible to select specific parameters to be written to the statistics files.

From the "Status" > "Display" panel, use the "Statistics file" check box on each parameter to trigger (checked) the output of the parameter value to the statistics files or not (unchecked).

7.2 Creating statistics files

To create statistics files:

1. Go to the "Settings" panel.
2. In the "Monitoring mode" box, check the "Create statistics file" box.



1. Specify a "File name".
2. Choose a "File type" for formatting data (CSV or XML).
3. Choose a "Sampling periodicity" between 1 second and 30 minutes. This value corresponds to the periodicity at which all parameter values are sampled and written to the statistics file.
4. Validate all new settings by clicking the check sign button.

Statistics files will be created with the "File name" specified, adding time and date as suffix, and "File type" as extension.

7.3 Retrieving statistics files

Important: Statistics files are deleted every 24 hours at 12:01pm (GMT Time, noon) to free up storage space for further statistics files. It is important to retrieve all statistics files you may need before they are deleted.

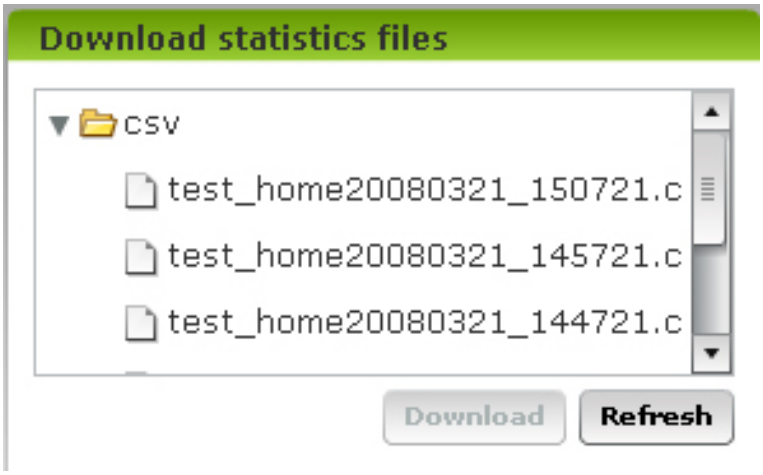
7.3.1 Retrieving statistics files through FTP

CastXplorer-C embeds an FTP server. It is possible to use this FTP server to retrieve all statistics files at once or selectively. For security reasons, it is only possible to use FTPS to communicate with the CastXplorer-C. Any FTP client supporting FTPS can be used (eg, FileZilla under Windows or ftp-ssl under Linux). For advanced use of the FTP client, please report to user instructions of the client.

Important: Your login and password to access this FTP server will be available on a separate document, shipped within the package.

7.3.2 Retrieving statistics files through the Web GUI

The Web-based interface can be used to retrieve statistics files stored on CastXplorer-C. However, this method is not recommended for retrieving a large number of files, as they will need to be retrieved one after the other.



To retrieve a statistics file from CastXplorer-C:

1. Go to the "Monitoring" panel. "Download statistics files" shows the directory structure of all statistics files stored on the CastXplorer-C: All CSV files are stored in a directory named CSV, and XML files are stored in a directory named XML.
2. Highlight the appropriate statistics file.
3. Click "Download".
4. Choose a local destination for saving the file.
5. Repeat the same steps for each statistics file to retrieve.

7.4 Managing statistics files through SNMP

To indicate that a parameter value should be written to the statistics file, the ENENSYS-CASTXPLORER-MIB should be used. The *testMonitoringLine* > *castXplorer* > *configuration* > *configStatistics* > *centralized* > *confCentralReportingTable* table manages the parameters for which value should be written to statistics file. To enable the writing to statistics files for a parameter, set the *confCentralReportingTableEnable* to 2, and to disable the writing to statistics files for a parameter, set the *confCentralReportingTableEnable* to 1.

Then, statistics files management is available through SNMP in the ENENSYS-CASTXPLORER-MIB file. All OIDs related to statistics files can be found in the *testMonitoringLine* > *castXplorer* > *configuration* > *configStatistics* node.

First, to enable the creation of statistics files, the *mode* OID must be set to centralized (2). Then, specify *fileName* and *fileType*, and define a periodicity for sampling parameter values by setting the *confCentralFrequencySampling* OID (expressed in seconds).

7.5 Statistics files format

Format of statistics files can either be CSV or XML.

7.5.1 CSV file format

When creating a statistics file of one minute with a sampling periodicity set to one second, and logging all parameters, each file will take up to approximately 10kB.

Below is a short extract of a CSV-formatted statistics file.

```
Name;Location;Date_Time;Channel_name;Rf_frequency;Rf_mode;
    Rf_modulation;Symbol_rate;Frontend;RF_LEVEL;SNR;MER;EVM;
    Pre_Rs_BER;CN;Overall_Bitrate;Net_Bitrate;TS_sync_loss;
    TS_sync_err;TS_pat_err2;TS_continuity_err;TS_PCR_rep;
    TS_PCR_Discerr;TS_CAT_err;TS_NIT_actual_err;
    TS_NIT_other_err
My_Probe;France, 35;2008-03-14T14:47:54Z;Channel
    01;177000000;Annex A-DVB-C;256_QAM;7000000;locked
    ;-18.85;41.00;35.11;1.08;1.00E-07;40.87;
    51608104;0;0;0;3;0;3;0;0;1;1
My_Probe;France, 35;2008-03-14T14:47:55Z;Channel
    01;177000000;Annex A-DVB-C;256_QAM;7000000;locked
    ;-18.85;41.00;34.59;1.15;1.00E-09;40.87;
    51608016;0;0;0;4;0;4;0;0;1;1
..
..
My_Probe;France, 35;2008-03-14T14:48:48Z;Channel
    01;177000000;Annex A-DVB-C;256_QAM;7000000;locked
    ;-18.85;41.00;35.60;1.00;1.00E-09;40.87;
    51607992;0;0;0;58;0;58;0;0;6;6
```

Note: Each file starts with the name of columns for easier reading in any external table editor.

7.5.2 XML file format

When creating a statistics file of one minute with a sampling periodicity set to one second, and logging all parameters, each file will take up to approximately 60kB.

Below is a short extract of an XML-formatted statistics file.

```
<?xml version="1.0"?>
<castXplorer>
   <row>
      <Name>castXplorer</Name>
      <Location>Rennes</Location>
      <Date_Time>2008-03-25T12:22:00Z</Date_Time>
      <Channel_name>Channel 4</Channel_name>
      <Rf_frequency>371125000</Rf_frequency>
      <Rf_mode>Annex A-DVB-C</Rf_mode>
      <Rf_modulation>64_QAM</Rf_modulation>
      <Symbol_rate>6875000</Symbol_rate>
      <Frontend>locked</Frontend>
      <RF_LEVEL>-49.69</RF_LEVEL>
      <SNR>36.81</SNR>
      <MER>33.92</MER>
      <EVM>1.24</EVM>
      <Pre_Rs_BER>1.00E-09</Pre_Rs_BER>
      <CN>36.64</CN>
      <Overall_Bitrate>38015256</Overall_Bitrate>
      <Net_Bitrate>30173400</Net_Bitrate>
      <TS_sync_loss>0</TS_sync_loss>
      <TS_sync_err>0</TS_sync_err>
      <TS_pat_err2>0</TS_pat_err2>
      <TS_continuity_err>47918</TS_continuity_err>
      <TS_PCR_rep>0</TS_PCR_rep>
      <TS_PCR_Discerr>737</TS_PCR_Discerr>
      <TS_CAT_err>0</TS_CAT_err>
      <TS_NIT_actual_err>1</TS_NIT_actual_err>
      <TS_NIT_other_err>0</TS_NIT_other_err>
   </row>
   ..
   </castXplorer>
```

8 Setting custom alarm thresholds

CastXplorer-C is capable of raising alarms on many RF and MPEG2-TS parameters. All alarms can be triggered based on user-defined thresholds.

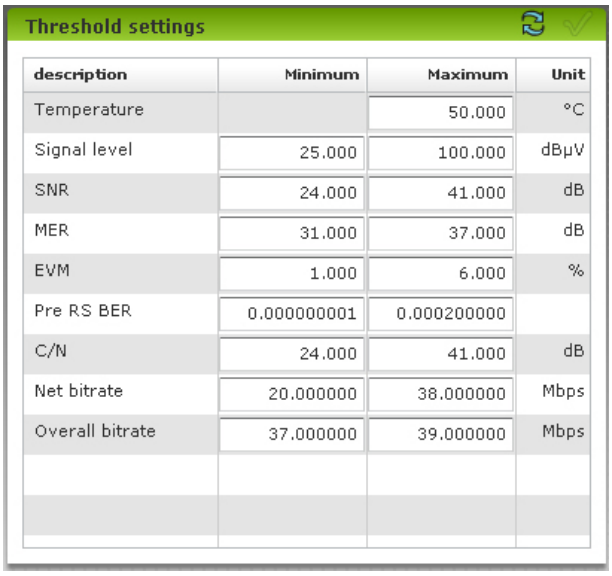
8.1 What is an alarm?

CastXplorer-C raises alarms based on user-defined thresholds: However, these alarms cannot be directly used. An internal process converts them to events,

leading to interaction. Each alarm has a user-defined severity and each alarm raised will trigger a log message. Then, based on user selection, each alarm can also trigger an SNMP trap or a dry relay out signal. Alarm management is available through the "Status" > "Display" panel.

8.2 Setting thresholds

Go to the "Status" panel, and click the "Settings" tab. All alarms requiring thresholds are listed there, over two boxes. First box "Threshold settings" lists all standard thresholds. Except for temperature which only accepts a maximum threshold, all threshold values are used to define a range. When parameters values are inside this range, no alarm is raised. When a parameter value goes out of range, an alarm is raised.



description	Minimum	Maximum	Unit
Temperature		50.000	°C
Signal level	25.000	100.000	dBµV
SNR	24.000	41.000	dB
MER	31.000	37.000	dB
EVM	1.000	6.000	%
Pre RS BER	0.000000001	0.000200000	
C/N	24.000	41.000	dB
Net bitrate	20.000000	38.000000	Mbps
Overall bitrate	37.000000	39.000000	Mbps

Second box "ETR settings" lists thresholds for ETR290 errors. Several values can be set there.

- Value: define the threshold for the ETR290 error (in milliseconds)
- Nb. Err.: define the maximum number of errors the ETR290 error is allowed to raise.
- Over Last: define the time period in which the previously defined maximum number of errors is allowed to be raised.

This specific setting is especially useful to limit the number of alarms raised on ETR290. For example, if you want to raise an alarm only if the time interval between two consecutive PCR values has been detected over 40ms more than 5 times in the last 5 seconds, settings should be as follows:

In the "ETR settings" box, Min and Max possible values are indicated for reference. The nominal value corresponds to the default value (and the value recommended in the TR 101 290 DVB Guidelines).

Specify all thresholds and settings over both boxes, then validate all new settings by clicking the check sign button.

8.3 Setting thresholds through SNMP

All alarms thresholds can be set through SNMP.

- Temperature threshold is available in *ENENSYS-MONITOR-MIB* > *alarmsAndLogs* > *alarms* > *alarmAdvancedConfig* > *temperatureAlarmConfig* > *maxTemperature*.
- RF and bit rate thresholds are available in *ENENSYS-CASTXPLORER-MIB* > *alarmsAndLogs* > *alarms* > *alarmAdvancedConfig*.
- ETR290 thresholds are available in two nodes:
  - Setting ETR290-defined thresholds can be achieved using *ENENSYS-CASTXPLORER-MIB* > *testMonitoringLine* > *castXplorer* > *configuration* > *configETR290*
  - Setting the period during which a specified number of ETR290 errors will raise an alarm can be achieved using *ENENSYS-CASTXPLORER-MIB* > *alarmsAndLogs* > *alarms* > *alarmAdvancedConfig*

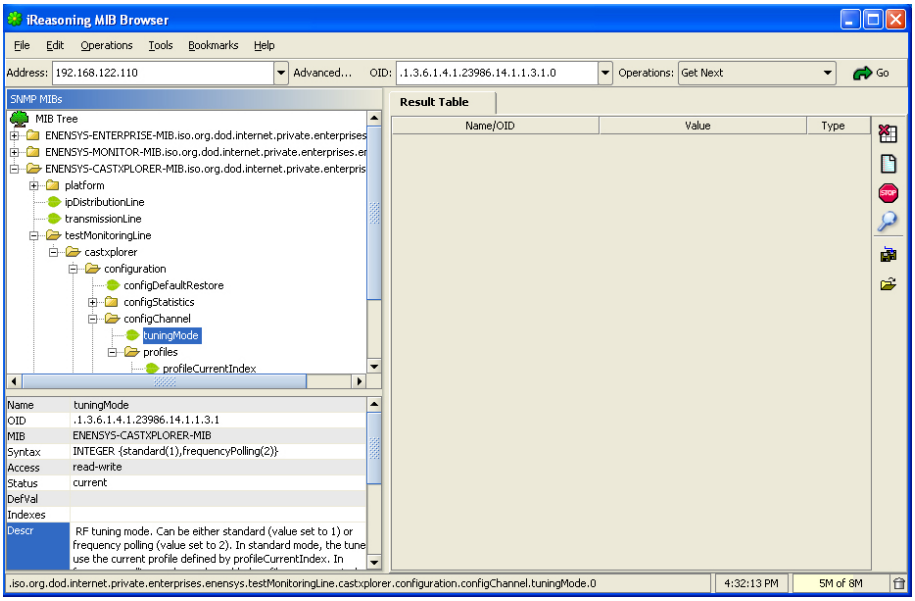
9 Using CastXplorer-C through SNMP

9.1 Overview

The CastXplorer-C devices use SNMP as the core communication protocol. Any HTTP request issued from the Web GUI or any command sent through the front panel will be dealt with using SNMP. The CastXplorer-C devices can not only be monitored using SNMP but can also be fully controlled.

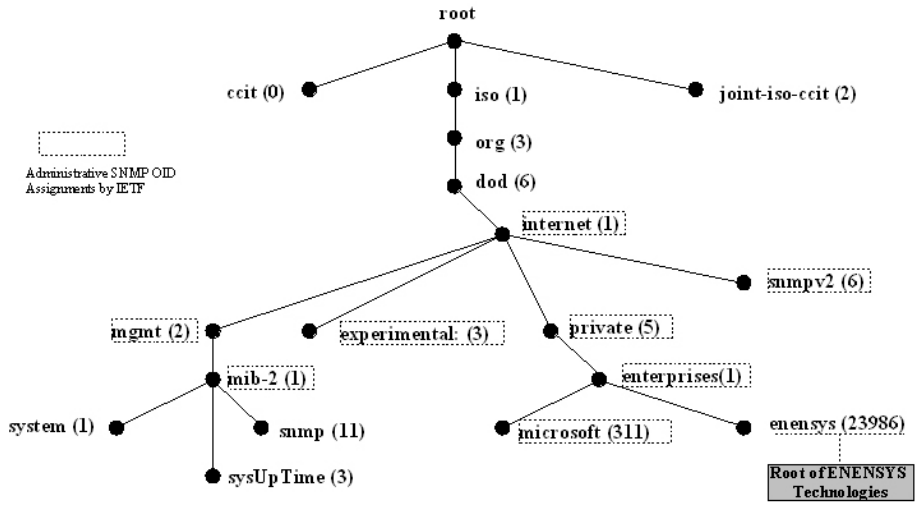
A MIB file is available on request.

MIB Browser from iReasoning can be used to test the CastXplorer-C SNMP feature. It can be used for monitoring (Get and Trap) as well as for the control (Set).



9.2 Overall MIB data structure

In SNMP, the information is described by means of objects within a tree-like data structure (known as an *MIB tree*). Some branches have been specified by IETF in various RFCs (Internet standards) and cannot be modified. One example is the RFC-1213 which describes system information such as time elapsed since system start-up.

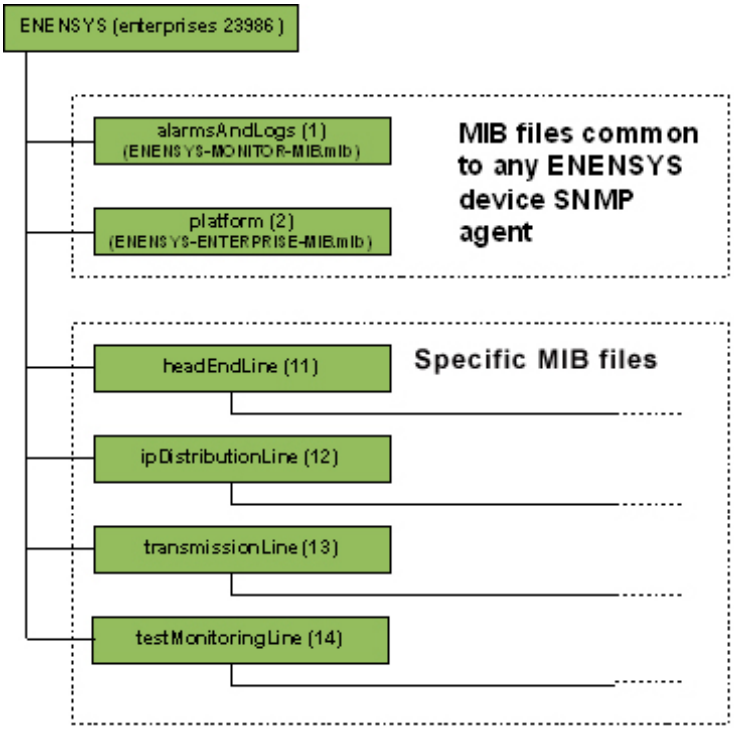


ENENSYS SNMP agent implements mib-2 defined by RFC-1213. This MIB is mandatory for SNMP compliance purposes. Furthermore, as one can see, root identifier 23986 has been assigned to ENENSYS Technologies. Any MIB defined by ENENSYS Technologies will be under this node.

9.2.1 MIB tree for all ENENSYS devices

Any ENENSYS SNMP agent implements three MIBs files. Two MIB files are common to ALL ENENSYS devices:

- ENENSYS-MONITOR-MIB.mib: This MIB file describes how alarms and logs are managed for all ENENSYS devices. This MIB is described in details in section 9.6, page 37.
- ENENSYS-ENTERPRISE-MIB.mib: Any settings common to all ENENSYS platforms are gathered within this MIB file. Detailed description is available section 9.5.3, page 36.
- The third MIB file is specific to the product type. Product type can be NN6-MIP, FastCaster, CastXPlorer etc. This MIB file is intended for configuring the device (please note Alarms configuration is not part of this specific MIB since this is implemented into ENENSYS-MONITOR-MIB.mib).



The integration of CastXplorer-C into any supervision system will require to implement both common MIB files as well as ENENSYS-CASTXPLORER-MIB.mib (device configuration and advanced monitoring).

9.3 SNMP ports

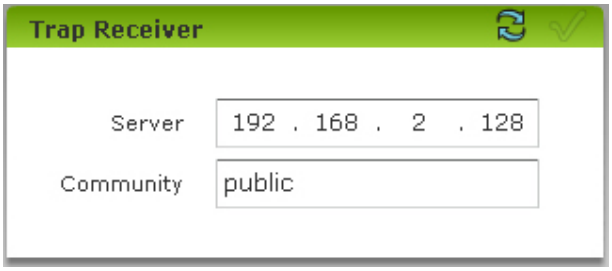
CastXplorer-C follows SNMP standard, and uses ports 161 (Agent Port) and 162 (Trap Port) for SNMP communication.

9.4 Connecting CastXplorer-C to a NMS

It is possible to use the CastXplorer-C together with a Network Monitoring System (NMS) to make the most of its capabilities.

First, in the "Network" panel, information about the NMS must be specified in the "Trap receiver" box. Specify the IP address of the NMS used to configure the CastXplorer-C and/or collect information. The SNMP community defines the relationship between the CastXplorer-C's SNMP server system and the NMS. The community acts like a password to control the NMS access to the server. If the community name contains spaces, enclose it in quotation marks.

This information is also available in the MIB file through the *trapV2DestinationTable* OID.



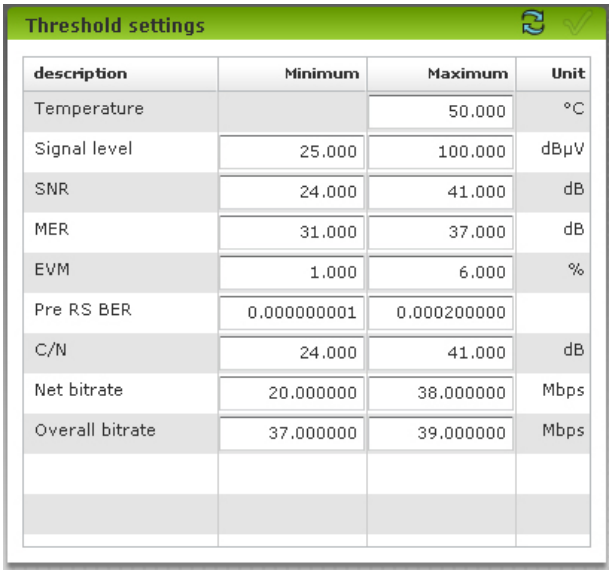
9.5 Receiving traps from CastXplorer-C

Once the communication between CastXplorer-C and the NMS has been set through the specification of the "Trap receiver" IP address and SNMP community, the CastXplorer-C must be specified for which parameter(s) it should send traps.

From the GUI, it is possible to specify for each parameter whether an SNMP trap should be raised whenever the set threshold is passed over.

9.5.1 Setting thresholds

First, thresholds should be set for each appropriate parameter. Go to the "Status" panel, and click the "Settings" tab. All alarms requiring thresholds are listed there, over two boxes. First box "Threshold settings" lists all standard thresholds. Except for temperature which only accepts a maximum threshold, all threshold values are used to define a range. When parameters values are inside this range, no alarm is raised. When a parameter value goes out of range, an alarm is raised.



Second box "ETR settings" lists thresholds for ETR290 errors. Several values can be set there.

- Value: define the threshold for the ETR290 error (in milliseconds)
- Nb. Err.: define the maximum number of errors the ETR290 error is allowed to raise.
- Over Last: define the time period in which the previously defined maximum number of errors is allowed to be raised.

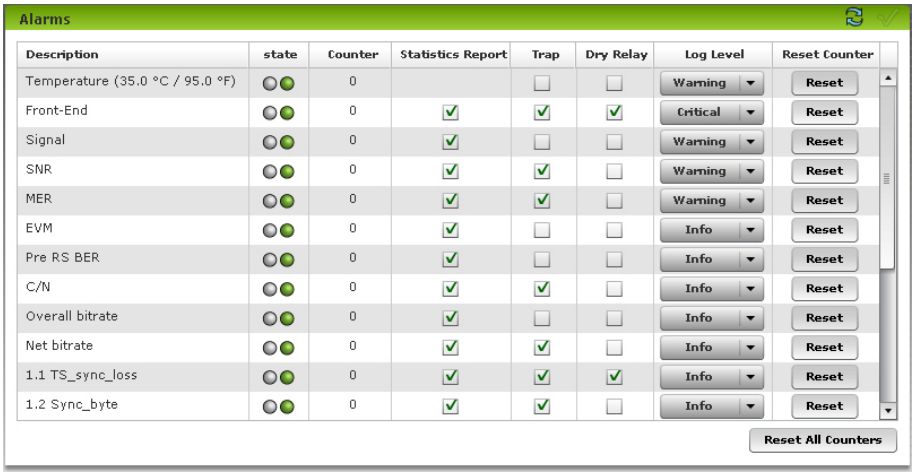
This specific setting is especially useful to limit the number of alarms raised on ETR290. For example, if you want to raise an alarm only if the time interval between two consecutive PCR values has been detected over 40ms more than 5 times in the last 5 seconds, settings should be as follows:

Specify all thresholds and settings over both boxes, then validate all new settings by clicking the check sign button.

Through SNMP, it is possible to set all thresholds through the ENENSYS-CASTXPLORER-MIB file, in the *alarmsAndLogs* > *alarms* > *alarmAdvancedConfig* node.

9.5.2 Enabling traps

Then, the alarm raised should raise an SNMP trap. Go to the "Status" panel, and click the "Display" tab.



This tab is used to manage all alarms that CastXplorer-C is capable of raising. The "Trap" column contains check boxes. For the CastXplorer-C to raise an SNMP trap when the threshold for a specific parameter is passed over, check the corresponding box.

This list of alarms is also used to set the severity of the alarm. Severities are especially useful to filter traps upon reception in the SNMP agent or NMS. For each alarm parameter, choose any severity between "Info", "Warning", or "Critical" in the "Log severity" drop-down list. The severity defined is common to both logs and SNMP traps.

Then validate all new settings by clicking the check sign button.

Through SNMP, it is possible to enable traps and configure log and trap severity through the ENENSYS-MONITOR-MIB file, in the *alarmsAndLogs* > *alarms* > *alarmTable* table. To enable SNMP traps for a parameter, set *alarmConfigSnmpTrap* to 2, and to disable SNMP traps, set *alarmConfigSnmpTrap* to 1.

9.5.3 Example of trap received

Below is a sample trap received for an alarm raised on a minimum SNR. Minimum threshold was set to 39.5dB.

```
2008-02-29 09:41:00 10.5.102.81 [UDP: [10.5.102.81]:1025]:
SNMPv2-SMI::mib-2.1.3.0 = Timeticks: (169178895) 19 days, 13
    :56:28.95
SNMPv2-SMI::snmpModules.1.1.4.1.0 = OID: ENENSYS-MONITOR-
    MIB::alarmTrap
ENENSYS-MONITOR-MIB::alarmStatus = INTEGER: alarmOn(2)
ENENSYS-MONITOR-MIB::logIndex.53 = INTEGER: 5375
ENENSYS-MONITOR-MIB::logId.53 = INTEGER: 53
ENENSYS-MONITOR-MIB::logDescr.53 = STRING: Alarm on SNR
ENENSYS-MONITOR-MIB::logObject.53 = OID: ENENSYS-CASTXPLORER-
    MIB::alarmSNR
ENENSYS-MONITOR-MIB::logTime.53 = STRING: 2008-02-29
    T08:40:57Z
ENENSYS-MONITOR-MIB::logSeverity.53 = INTEGER: event(1)
ENENSYS-MONITOR-MIB::logComponent.53 = STRING: Tuner
ENENSYS-MONITOR-MIB::logText.53 = STRING: SNR: min. threshold
     (39.500) reached, cur. val: 38.355 on Channel 01
```

When a parameter value goes back to the expected range, an SNMP trap is also sent, indicating the alarm has gone back to Off state. Below is a sample trap received for an SNR value going back to the expected range.

```
2008-02-29 09:41:10 10.5.102.81 [UDP: [10.5.102.81]:1025]:
SNMPv2-SMI::mib-2.1.3.0 = Timeticks: (169179001) 19 days, 13
    :56:30.01
SNMPv2-SMI::snmpModules.1.1.4.1.0 = OID: ENENSYS-MONITOR-
    MIB::alarmTrap
ENENSYS-MONITOR-MIB::alarmStatus = INTEGER: alarmOff(1)
ENENSYS-MONITOR-MIB::logIndex.53 = INTEGER: 0
ENENSYS-MONITOR-MIB::logId.53 = INTEGER: 53
ENENSYS-MONITOR-MIB::logDescr.53 = STRING: Alarm on SNR
ENENSYS-MONITOR-MIB::logObject.53 = OID: ENENSYS-CASTXPLORER-
    MIB::alarmSNR
ENENSYS-MONITOR-MIB::logTime.53 = STRING: 2008-02-29
    T08:40:59Z
ENENSYS-MONITOR-MIB::logSeverity.53 = INTEGER: event(1)
ENENSYS-MONITOR-MIB::logComponent.53 = STRING: Tuner
ENENSYS-MONITOR-MIB::logText.53 = STRING: SNR: no alarm
```

Below is another trap sample for an ETR290 error (2.3a PCR repetition). The threshold was set to a maximum of 5 PCR errors in the last 10 seconds.

```
2008-02-29 09:28:54 10.5.102.81 [UDP: [10.5.102.81]:1025]:
SNMPv2-SMI::mib-2.1.3.0 = Timeticks: (169106558) 19 days, 13
   :44:25.58
SNMPv2-SMI::snmpModules.1.1.4.1.0 = OID: ENENSYS-MONITOR-
   MIB::alarmTrap
ENENSYS-MONITOR-MIB::alarmStatus = INTEGER: alarmOn(2)
ENENSYS-MONITOR-MIB::logIndex.214 = INTEGER: 5323
ENENSYS-MONITOR-MIB::logId.214 = INTEGER: 214
ENENSYS-MONITOR-MIB::logDescr.214 = STRING: Alarm on TS pcr
   rep. err
ENENSYS-MONITOR-MIB::logObject.214 = OID:
ENENSYS-CASTXPLORER-MIB::alarmTSPcrRep
ENENSYS-MONITOR-MIB::logTime.214 = STRING: 2008-02-29
   T08:28:54Z
ENENSYS-MONITOR-MIB::logSeverity.214 = INTEGER: event(1)
ENENSYS-MONITOR-MIB::logComponent.214 = STRING: Tuner
ENENSYS-MONITOR-MIB::logText.214 = STRING: TS_PCR_rep: limit
   (5) in period
reached, cur. val: 1004 on Channel 01
```

9.6 Integrating ENENSYS-ENTERPRISE-MIB.mib file

ENENSYS-ENTERPRISE-MIB.mib defines enterprise node *enensys* with enterprise identifier 23986, but also *ipDistributionLine*, *headEndLine*, *testMonitoringLine* and *transmissionLine* nodes. Our concern here will be *platform* node, gathering all information common to all ENENSYS devices, except for logs, alarms and traps which are defined in ENENSYS-MONITOR-MIB.mib. When expanding ENENSYS-ENTERPRISE-MIB.mib, *platform* is the root node, and divides in 4 branches:

- *device*: Factory information settings and various functionalities such as device reboot, etc.
- *network*: One table gathers network settings such as IP control address, gateway etc...
- *dateTime*: Date and time information, and especially the source used.
- *temperature*: Current device temperature (GET only).

Important: Please note that OIDs may not all be relevant to CastXplorer-C. Especially in the *newtork* node, the IP "Control Eth." in-

terface used for controlling the CastXplorer-C should be the interface with *interfaceIndex* 2.

9.7 Integrating ENENSYS-MONITOR-MIB.mib file

Alarms, logs and traps management is achieved using ENENSYS-MONITOR-MIB.mib file. Lots of work have been done in order to provide supervision system with a state-of-the-art management. When opening ENENSYS-MONITOR-MIB.mib, four main branches are gathered under the root node *alarmsAndLogs*.

- *currentStatus*: Status of the device (warning, critical, etc.)
- *alarms*: Alarm management and configuration.
  - The *alarms* node is basically the keystone for any ENENSYS device alarm management. All the information related to alarms triggered and alarms configuration is gathered under this node. Alarms management has been designed so that the supervision system is not required to go through *alarmCurrentTable* table all the time. Instead, the monitoring system only has to pull *alarmCurrentCount* on a regular basis, and check if anything changed. Please note that this node *alarms* is only intended for monitoring purposes. Settings are not available (read-only MIB objects).
  - *alarmCurrentTable* is intended to register all active alarms: If the alarm disappears (turns to Off status), it will be removed from this table. The idea is to provide the monitoring system with an instant view of the system, but also to detect potential alarms missed by the monitoring system.
  - *alarmTable* is intended for configuring any alarm supported by the device.
  - *AlarmAdvancedConfig* is used for setting temperature threshold.
- *logs*: Log management. The *logs* node groups within the *logTable* all log entries, within the limitation defined through maximum *logCapacity*. A mechanism is used to clear the log table, but also to know which is the last log entry. Based on *logLastEvent*, the monitoring system is able to find out whether it has missed a trap or not: the monitoring system only has to pull *logLastEvent*, and check whether the value has changed compared to last time. If the value has changed, this may signify the

monitoring system has missed a trap. Please note that a log entry is not linked to an alarm configured to send a trap (unless all alarms are configured for sending traps).

- *traps*: Trap receiver configuration. The *traps* node is intended to provide the monitoring system with a flexibility regarding trap reception.
  - *alarmTrap* MIB object cannot be set nor get. This MIB object just defines trap content. Any trap sent will embed the following MIB object information: logIndex, logId, logObject, logTime, logSeverity, logComponent, logText and logDescr.
  - *trapV2DestinationTable* is used to configure trap receiver. It is possible to address up to 10 monitoring systems. The IP address of the monitoring system must be specified as well as the associated destination SNMP community.

Important: Please note that all thresholds of RF and MPEG2-TS alarms are managed through ENENSYS-CASTXPLORER-MIB.mib file because they are specific to CastXplorer-C. This management can be found in *alarmsAndLogs* > *alarms* > *alarmAdvancedConfig*.

10 Upgrading CastXplorer-C

10.1 Getting information on current release

The current firmware version used on the CastXplorer-C is available from the "About" tab in the "Information" box.

Through SNMP, this information is available from the *ENENSYS-ENTERPRISE-MIB* file, then from the *platform* > *device* > *deviceFirmwareVersion* leaf. It is also possible to know about the last upgrade performed on the
CastXplorer-C through the *deviceLastUpdateTime* leaf. If this OID returns 0, it means that the CastXplorer-C is using the factory settings firmware.

Information on current release is also available from the front panel (please refer to section 3, page 7).

10.2 Installing an upgrade firmware

To upload an upgrade firmware to the CastXplorer-C:

1. Go to the "About" tab.
2. In the "Device update" box, click "Select update".
3. Select the appropriate .bin file from the file selection dialog box.
4. Then click "Update".
5. Confirm with "Yes". Please note that all statistics files will be removed as CastXplorer-C reboots automatically at the end of the upgrade process.

Through SNMP, the CastXplorer-C can be upgraded from the *ENENSYS-ENTERPRISE-MIB* file, then from the *platform* > *device* > *deviceUpdateAddress* leaf. Set this OID to an URL corresponding to the appropriate .bin file for upgrade.

11 Getting general information about the probe

It is possible to get information on a specific probe on the network. Using the Web interface, go to the "About" panel. This panel provides information about the device:

- User-defined parameters, such as name and location.
- Device parameters, such as serial number and firmware version.

This information can also be accessed through SNMP, in the *ENENSYS-ENTERPRISE-MIB* > *platform* > *device* node.

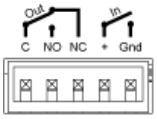
12 Identifying the CastXplorer-C controlled

When you have several CastXplorer-C devices located in the same premises, you can always identify the one currently controlled through the GUI by clicking the "identification" button on the "About" panel.

If you click this button, the LED on the front panel will start blinking green for 10 seconds.

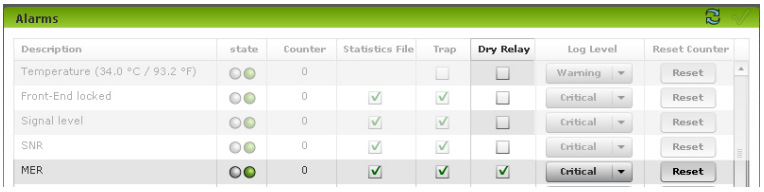
13 Using the dry relay out interface

CastXplorer-C features a relay out interface. This interface can be connected to a dry contact or contact closure manager to achieve a monitoring system.



In order to trigger an alarm on this interface, CastXplorer-C must be configured to raise a dry relay out signal on a specific alarm. To do so, go to the "Status" panel. Within the list of alarms, the "Dry Relay" check box column is used to enable or disable the relay out signal. When the box is checked, the alarm raised on the parameter sends out a dry relay out signal to the electrical interface (Common ("C") connected to Normally Closed ("NC")).

Through SNMP, the dry relay out signal on each parameter can be managed through the ENENSYS-MONITOR-MIB > *alarmsAndLogs* > *alarms* > *alarmTable* table. To enable dry relay out, set the *alarmConfigRelayOut* to 2, and to disable dry relay out, set the *alarmConfigRelayOut* to 1.



Note: Electrical level of alarm state (Common ("C") connected to Normally Closed ("NC")) means that at least one of the parameters enabled for dry relay has raised an alarm. It only goes back to normal state (Common ("C") connected to Normally Open ("NO")) if no parameter has raised an alarm. It is therefore recommended to limit the number of parameters enabled for sending out dry relay signals, as it is not possible to be informed of which parameter has raised the alarm.

14 Definitions of parameters monitored

14.1 RF and transmission parameters

- SNR: Signal to Noise ratio. This ratio is an indicator of the QAM signal quality. It performs a comparison between the total noise strength on the signal monitored and the signal power as measured after the receive filter within the tuner. It is expressed in dB.
- C/N: Carrier-to-Noise. This ratio shows the signal quality as measured within the transmission channel. It is expressed in dB.

- Signal Level: This measure is a direct expression of the signal strength received on the RF interface of CastXplorer-C. It is expressed in dBμV.
- MER: Modulation Error Ratio. This ratio is also an indicator of the QAM signal quality. MER is expressed in dB and is a representation of the distance between constellation points actually measured and theoretical constellation points. It is an indicator of noise, interferences or distortions on the signal. It is expressed in dB.
- EVM: Error Vector Magnitude. This value measures the vector magnitude between the constellation point actually measured and the theoretical constellation point. It is an indicator of interferences or distortions on the signal. This value is expressed as a percentage.

14.2 ETR290 parameters

ETR290 is standardized guidelines issued by the DVB organization for measurements in DVB systems. These guidelines are intended to provide an exhaustive overview of elements that matter for the transmission of a stream. All parameters tested in ETR290 are split over three priorities.

- First-level priority lists a basic set of parameters which are considered necessary to ensure that the TS can be decoded.
- Second-level priority lists additional parameters which are recommended for continuous monitoring.
- Third-level priority lists further optional parameters covering varied interests.

The following ETR290 parameters are available in CastXplorer-C.

Priority 1		
1.1	TS Sync Loss	Loss of synchronization with consideration of hysteresis parameters. It is proposed that five consecutive correct sync bytes (ISO/IEC 13818-1 [1], clause G.01) should be sufficient for sync acquisition, and two or more consecutive corrupted sync bytes should indicate sync loss.

1.2	Sync Byte Error	Sync_byte not equal to 0x47.
1.3*a*	PAT Error	• Sections with table_id 0x00 do not occur at least every 0,5 s on PID 0x0000. • Section with table_id other than 0x00 found on PID 0x0000. • Scrambling_control_field is not 00 for PID 0x0000
1.4	Continuity Count Error	• Incorrect packet order. • A packet occurs more than twice lost packet.
Priority 2		
2.3*a*	PCR Repetition Error	Time interval between two consecutive PCR values more than a specified value expressed in ms (recommended value is 40 ms).
2.3*b*	PCR Discontinuity Indicator Error	The difference between two consecutive PCR values (PCRi+1 – PCRi) is outside the range of 0...100 ms without the discontinuity_indicator set.
2.6	CAT Error	• Packets with transport_scrambling_control not 00 present, but no section with table_id = 0x01 (i.e. a CAT) present. • Section with table_id other than 0x01 (i.e. not a CAT) found on PID 0x0001.

Priority
3

3.1*a* NIT Actual Error

- Section with table_id other than 0x40 or 0x41 or 0x72 (i. e. not a NIT or ST) found on PID 0x0010.
- No section with table_id 0x40 (i.e. a NIT_actual) in PID value 0x0010 for more than 10 s.
- Any two sections with table_id = 0x40 (NIT_actual) occur on PID 0x0010 within a specified value (25 ms or lower).

3.1*b* NIT Other Error — Interval between sections with the same section_number and table_id = 0x41 (NIT_other) on PID 0x0010 longer than a specified value (10s or higher).

15 Regulatory and Statutory Notices

15.1 EMC and safety declaration

This equipment is a class B digital device. It has been designed and tested to meet the requirements set by the European Community directives and comply with the EN50022 and EN50024 rules as an Information Technology Equipment. It also complies with EN55103-1 and 55103-2 rules applying to Audio Video equipments under E1 to E5 environment conditions. To ensure compliance, properly shielded cables shall be used for data I/Os, proper power cable and technical grounding connection shall be used to feed the Network Adapter and device shall be operated as described in that document.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interferences in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

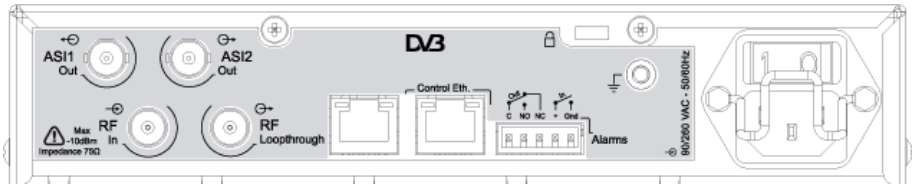
ENENSYS CastXplorer-C has been designed to meet the safety requirements of Information Technology Equipment including business equipment from the European EN 60950 and International IEC 950. For safety reasons, do not open the metal housing but contact ENENSYS Technical Support.

15.2 Environmental specifications

Power supply	100-240VAC
Power consumption	10 W
Operating temperature	0 to 60°C / 0 to 122°F
Storage temperature	-20 to 70°C / -4 to 158°F
Humidity	0 to 95%, non condensing
Height	43 mm / 1.7"
Width	220 mm / 8.7"
Depth	263 mm / 10.4"
Weight	2.0 kg / 4.4 lb
Format	1 RU, $\frac{1}{2}$ width 19"

16 Technical Data

16.1 Interfaces Specifications



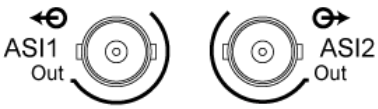
16.1.1 RF Interfaces

RF interfaces are equipped with F-Type (female) connectors, with a 75-ohm impedance. RF input cannot take a signal level higher than -10dBm. The cable transporting the Digital Cable signal to be monitored should be connected to that interface.

RF loopthrough is a passive loopthrough. Please note that when initializing (at startup or on reboot), CastXplorer-C cuts the passive loopthrough for about 3 to 4 seconds.

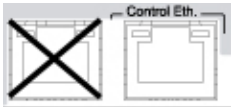
16.1.2 ASI Interfaces

The 2x DVB-ASI output are mirrored outputs: The CastXplorer-C outputs the same demodulated signal on both DVB-ASI interfaces.



16.1.3 Ethernet Interface

The CastXplorer-C includes 1x 10/100 Base-T Ethernet interface for control purposes.

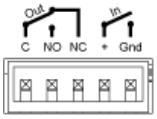


The Ethernet port which has no label and is shipped with a plastic cap should not be used.

16.1.4 Fault Relay Alarm

This alarm is compatible with common dry relay or contact closure management systems. Some systems are capable of translating dry relay signals to SNMP traps. The connector located on the back panel is a 5-position MiniConnec with a 3.81mm pitch.

For further information on how to use this interface, please refer to section 12, page 40.



17 Frequently Asked Questions

17.1 What is the IP address of the CastXplorer-C?

When you receive the CastXplorer-C from ENENSYS, the factory settings IP address is http://192.168.120.100.

Afterwards, this IP address can be configured either through the "Network" panel or through the Front Panel.

17.2 My monitoring panel looks frozen

Bit rate graphs and real-time gauges are missing. New log messages are not written to the log window. Your browser may have lost the connection to the CastXplorer-C. Click the Refresh button (or press F5) to reinitialize the communication.

18 Troubleshooting

18.1 Web server is not responding

Web interface is not responding or is not reachable:

- Don't forget that Flash player must be installed on the PC!

Bit rate graphs and real-time gauges are missing. New log messages are not written to the log window. Your browser may have lost the connection to the CastXplorer-C. Click the Refresh button (or press F5) to reinitialize the communication.

18.2 Web interface shows wrong information

It may sometimes be useful to completely refresh the Web browser, because some information may be kept in cache. Therefore when monitoring several CastXplorer-C devices from the Web GUI, it is recommended to close the Web browser before switching to another CastXplorer-C. It is either not recommended to use a different tab in the same browser, as cache information is shared between tabs.

19 Equipment return for repair

In case of any trouble with one of ENENSYS Technologies' products, please report it to our Technical Support team via email (support@enensys.com). Your request should specify Part Number and Serial Number as displayed on the bottom label of the equipment, with a description of the defect, reference of Purchase Order if possible, and your full details.

Upon receiving your request, a support engineer will get in touch with you in order to surely identify the source of your problem. If equipment has to be returned for repair, a RMA[4] number will be provided to you. You will need to indicate it on the shipping box of the faulty equipment, and/or add it in your communication with our support team. Your equipment will be shipped back to you along with a repair report.

20 Upgrades and Privileged Area

A privileged area (http://privileged.enensys.com) is available on ENENSYS' website. Any registered user has access to the privileged area where general documentation, user's manuals, softwares and products' upgrades can be downloaded. In order to get access to the privileged area, you should register through the registration form. You will then receive a password that will give you access to the privileged area.

Registration is highly recommended as product upgrades will be announced using the registered users mailing list.

[4] Returned Material Authorization

21 Contact Information

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